



*Curriculum Vitae*

RUSSELL GENE HIGUCHI

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Work Address:  
Human Genetics Department  
Roche Molecular Systems, Inc.  
1145 Atlantic Avenue  
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Birthdate: November 4, 1952

**Education**

*University of California, Los Angeles, CA*  
Ph.D. in Molecular Biology, 1980  
Thesis: "The Development and Application of  
Recombinant DNA Techniques"

*University of California, Los Angeles, CA*  
B.Sc. in Biochemistry, with honors, 1974

**Additional  
Training**

Cold Spring Harbor Summer Course  
"Plant Molecular Biology", 1982

**Research  
Experience**

*Research Investigator*  
Human Genetics Dept., Roche Molecular Systems, Inc., 1991 - Present  
*In vitro* DNA diagnostics research

*Scientist*  
Human Genetics Dept., Cetus Corporation, 1988 - 1991  
Project supervisor, "AmpliType™" PCR-based human identification kit. Worked  
on means of manufacture of immobilized, oligonucleotide probe-based typing  
systems for test kits.

*Associate Scientist*  
Human Genetics Dept., Cetus Corporation, 1986-1988  
Worked on development and application of the Polymerase Chain Reaction (PCR).  
Demonstrated use of PCR in direct genomic sequencing, pathogen detection, gene  
construction and mutagenesis, and human identification.

*Postgraduate Research Biochemist*

University of California, Berkeley, 1983-1986

First cloning and sequencing of DNA of an extinct animal, the quagga. Assignment of phylogenetic position of the quagga on the basis of recovered DNA. Studied mitochondrial DNA inheritance in human population looking for individual-specific variation at the DNA sequence level. With Prof. Allan C. Wilson (deceased), Dept. of Biochemistry.

*Postdoctoral Fellow*, University of CA, Berkeley, 1980 - 1983

Detection of 40,000 yr.-old mammoth DNA. Mitochondrial DNA inheritance in mice. Studies on genomic rearrangements and evolution. With Prof. Allan C. Wilson, Dept. of Biochemistry.

*Graduate Assistant*, University of CA, Los Angeles, 1975 - 1980

Early development of cDNA cloning technique and of genomic libraries. Studies on mammalian globin and ribosomal genes using these techniques and using electron microscopy of nucleic acids. With Prof. Winston Salser, Molecular Biology Inst.

**Teaching  
Experience**

*Guest Lecturer*

University of California Extension "Molecular Biology" 1990

University of California Gifted Program "Molecules of Life" 1984

*Instructor*

"Mitochondrial DNA" - Undergraduate Seminar

University of California, Berkeley, 1983

*Teaching Assistant*

"Molecular Biology" - Undergraduate Course, University of California, Los Angeles

*Directed Research*

Supervised the laboratory work of three undergraduate students while I was at UCLA and of two graduate students and four undergraduates at UC Berkeley

**Awards and  
Fellowships**

Special Achievement Award, PCR Division, Cetus Corp., 1990

N.I.H. postdoctoral fellow, 1980-1983

N.I.H. predoctoral fellow, 1975-1978

California State Scholarship, 1970-1971

**Service** Occasional referee for articles in scientific journals and for N.I.H. and other grant proposals

**References** Henry A. Erlich, Ph.D.  
Director, Human Genetics  
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Dr. John Sninsky  
Director, Infectious Diseases Dept.  
Roche Molecular Systems, Inc.  
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Dr. Ellen Prager  
Dept. of Biochemistry  
Univ. of California, Berkeley, CA 94720  
(415) 642-7437

Dr. Winston Salser, Professor  
Dept. of Biology and Molecular Biology Institute  
Univ. of California, Los Angeles, CA 90024  
(213) 825-1670

## Publications

Higuchi, R., Paddock, G.V., Wall, R., and Salser, W. (1976) "A General Method for Cloning Eucaryotic Gene Sequences" *Proc. Natl. Acad. Sci. U.S.A.*, 73: 3146-3150.

Paddock, G.V., Higuchi, R., Wall, R., and Salser, W. (1976) "Insertion of Rabbit Globin Sequences into *E. coli* Plasmids" *ICN-UCLA Symposia on Molecular and Cellular Biology*, Vol V, 535-541.

Salser, W., Browne, J., Clarke, P., Heindell, H., Higuchi, R., Paddock, G.V., Roberts, J., Studnicka, G., and Zackar, P. (1977) "Determination of Globin mRNA Sequences and their Insertion into Bacterial Plasmids," *Prog. Nucleic Acids Res.*, 19: 177-204.

Wall, R., Gilmore-Hebert, M., Higuchi, R., Komarmy, M., Paddock, G.V., and Salser, W. (1978), "Recombinant DNA Clones Constructed from Immunoglobulin Kappa Light Chain Messenger RNA," *Nucleic Acids Res.*, 5: 3113-3128.

Padayatty, J., Cummings, I., Manske, C., Higuchi, R., Woo, S., and Salser, W. (1978), "cDNA Cloning of Chicken Globin mRNAs in Bacterial Plasmids", *Gene*, 13: 417-422.

Higuchi, R., Stang, H., Browne, J., Martin, M., Huot, M., and Salser, W. (1981) "Human Ribosomal RNA Gene Spacer Sequences are found Interspersed Elsewhere in the Genome" *Gene*, **15**: 177-186

Higuchi, R., and Wilson, A.C. (1984), "Recovery of DNA from Extinct Species", *Fed. Proc.*, **43**: 1557.

Higuchi, R., Bowman, B., Freiberger, M., Ryder, O.A., and Wilson, A.C. (1984), "DNA Sequences from the Quagga, an Extinct Member of the Horse Family", *Nature*, **312**: 282-284.

Wilson, A.C., Cann, R.L., Carr, S.M., George, M., Gyllenstein, U.B., Helm-Bychowski, K.M., Higuchi, R.G., Palumbi, S.R., Prager, E.M., Sage, R.D., and Stoneking, M. (1985), "Mitochondrial DNA and Two Perspectives on Evolutionary Genetics" *Biol. J. Linnean Soc.*, **26**: 375-400.

Higuchi, R., Wrischnik, L., Oakes, E., George, M., Tong, B., and Wilson, A.C. (1987), "Mitochondrial DNA of the Extinct Quagga: Relatedness and Extent of Postmortem Change", *J. Molecular Evolution*, **25**: 283-287.

Wilson, A.C., Stoneking, M., Cann, R.L., Prager, E.M., Ferris, S.D., Wrischnik, L.A., and Higuchi, R.G. (1987), "Mitochondrial Clans and the Age of Our Common Mother", in *Human Genetics*, F. Vogel and K. Sperling (Eds.), Springer-Verlag Berlin-Heidelberg, pp. 158-164.

von Beroldingen, C.H., Higuchi, R.G., Sensabaugh, G.F., and Erlich, H.A. (1987), "Analysis of Enzymatically Amplified HLA-DQ alpha DNA from Single Human Hairs", *Am. J. Hum. Genet.*, **41**: 244-250.

Wong, C., Dowling, C.E., Saiki, R.K., Higuchi, R.G., Erlich, H.A., and Kazazian, H.H. Jr. (1987), "Characterization of beta-thalassemia Mutations Using Direct Genomic Sequencing of Amplified Single Copy DNA", *Nature*, **330**: 384-386.

Wrischnik, L.A., Higuchi, R.G., Stoneking, M., Erlich, H.A., Arnheim, N., and Wilson, A.C. (1987), "Length Mutations in Human Mitochondrial DNA: Direct Sequencing of Enzymatically Amplified DNA", *Nucleic Acids Res.*, **15**: 529-542.

Higuchi, R.G., Krummel, B., and Saiki, R.K. (1988), "A General Method of *in vitro* Preparation and Specific Mutagenesis of DNA Fragments: Study of Protein and DNA Interactions", *Nucleic Acids Res.*, **16**: 7351-7367.

Higuchi, R.G., von Beroldingen, C.H., Sensabaugh, G.F., and Erlich, H.A. (1988), "DNA Typing from Single Hairs", *Nature*, **332**: 543-546.

Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R.G., Horn, G.T., and Mullis, K.B. (1988), "Primer-directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase", *Science* **239**: 487-491.

Erlich, H.A., Bugawan, T.L., Scharf, S.J., Horn, G.T., Higuchi, R.G., and Saiki, R.K. (1989), "Genetic Analysis of Enzymatically Amplified DNA", *Molecular Probes: Technology and Medical Applications*, p 5-8.

Higuchi, R.G., and Ochman, H. (1989), "Production of Single-Stranded DNA Templates by Exonuclease Digestion Following the Polymerase Chain Reactions", *Nucleic Acids Res.*, **17**: 5865-5870.

Kwok, S.Y., and Higuchi, R.G. (1989), "Avoiding False Positives with PCR", *Nature*, **339**: 237-238 (Product Review).

Paabo, S., Higuchi, R.G., and Wilson, A.C. (1989), "Ancient DNA and the Polymerase Chain Reaction. The Emerging Field of Molecular Archaeology", *J. Biol. Chem.*, **264**: 9709-9712.

Higuchi, R., and Blake, E.T. (1989), "Applications of the Polymerase Chain Reaction in Forensic Science", *Banbury Report 32: DNA Technology and Forensic Science*, pp. 265-281.

Higuchi, R., "Simple and Rapid Preparation of Samples for PCR" in *PCR Technology: Principles and Applications for DNA Amplification* H.A. Erlich (Ed.). Stockton Press, New York, NY, (1989) pp.31-38.

Higuchi, R., "Using PCR to Engineer DNA" in *PCR Technology: Principles and Applications for DNA Amplification* H.A. Erlich (Ed.). Stockton Press, New York, NY (1989) pp.61-70.

von Beroldingen, C.H., Blake, E.T., Higuchi, R., Sensabaugh, G.F., and Erlich, H. "Applications of PCR to the Analysis of Biological Evidence" in *PCR Technology: Principles and Applications for DNA Amplification* H.A. Erlich (Ed.). Stockton Press, New York, NY (1989) pp.209-223.

Walsh, S., Higuchi, R., and Blake, E., "PCR Inhibition and Bloodstains" in *Proceedings of the International Symposium on the Forensic Aspects of DNA Analysis*. June 19-23, 1989, Quantico Virginia. The Laboratory Division, Federal Bureau of Investigation, Washington, D.C., pp.281-282.

Higuchi, R., "Recombinant PCR" in *PCR Protocols: A Guide to Methods and Applications* M.A. Innis, D.H. Gelfand, J.J. Sninsky and T.J. White (Eds.). Academic Press, Inc. (1990) pp.177-183.

Shibata, D., Namiki, T., and Higuchi, R. (1990), "Identification of a Mislabeled Fixed Specimen by DNA Analysis", *Am. J. Surgical Pathology*, **14**: 1076-1078.

Stoneking, M., Hedgecock, D., Higuchi, R.G., Vigilant, L., and Erlich, H.A. (1991), "Population Variation of Human Mitochondrial DNA Control Region Sequences Detected by Enzymatic Amplification and Sequence-Specific Oligonucleotide Probes", *Am. J. Hum. Genet.* **48**: 370-382.

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George, P.M., Myles, T., Williamson, D., Brennan, S.O., Chan, J., Kan, Y.W., Higuchi, R., and Symmans, W.A. (1990), "A Family with Hemolytic Anemia and Three  $\beta$ -Globins: The Deletion in Hemoglobin Atlanta-Coventry ( $\beta 75$  Leu $\rightarrow$ Pro, 141 Leu deleted) is not Present at the Nucleotide Level", *Blood* (submitted).

Erlich, H., Bugawan, T., Begovich, A.B., Scharf, S., Griffith, R., Saiki, R., Higuchi, R., and Walsh, P.S. (1991), "HLA-DR, DQ and DP typing using PCR amplification and immobilized probes", *Eur. J. Immunogenet.*, **18**: 33-55.

Walsh, P.S., Metzger, D.A., and Higuchi, R. (1991), "Chelex<sup>®</sup> 100 as a medium for simple extraction of DNA for PCR-Based typing from forensic material," *BioTech.*, **10**: 506-513.

Higuchi, R. (1991), "PCR and Forensic DNA Typing" *Promega Symposium on Human Identification* (in press).

Blake, E., Mihalovich, J., Higuchi, R., Walsh, P.S., and Erlich, H. (1991), "PCR amplification and HLA-DQ $\alpha$  oligonucleotide typing on biological evidence samples: Casework experience" (submitted).

Walsh, P.S., Fildes, N., Louie, A.S., and Higuchi, R. (1991), "Report of the blind trial of the Cetus AmpliType HLA DQ $\alpha$  forensic deoxyribonucleic acid (DNA) amplification and typing kit," *J. Forensic Sci.*, **36**: 1551-1556.